Third Five-Year Review Report

for

LeHillier/Mankato Superfund Site

City of Mankato

Blue Earth County, Minnesota

September 2006

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List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
FIT	Field Investigation Team
HRL	Health Risk Level
HRS	Hazard Ranking System
IC	Institutional Control
MCL	Maximum Contaminant Level
MERLA	Minnesota Environmental Liability and Response Act
MPCA	Minnesota Pollution Control Agency
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PLP	Permanent List of Priorities
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SDWA	Safe Drinking Water Act
TBCs	To be Considereds
TCE	Trichloroethylene
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

Executive Summary

The remedy for the LeHillier/Mankato Superfund (LeHillier) site (the Site) located in Mankato, Minnesota, included pumping groundwater from multiple extraction wells to control the groundwater gradient and to reduce the mass of trichloroethylene (TCE) discharging to the Blue Earth River, groundwater treatment using a packed tower air stripping system, extension of the LeHillier community water supply system to the affected residents and businesses, the proper abandonment of the individual drinking water wells, and long-term monitoring of groundwater for volatile organic compounds (VOCs). The trigger for this five-year review was the completion date for the previous five-year review.

In September 1989, operation of the groundwater extraction system began. Groundwater extraction was performed at seven pump-out wells from 1989 through 1997. In November 1997, the groundwater extraction system was shut down and a monitoring program was initiated to evaluate the fate and transport of contamination under non-pumping conditions. Groundwater monitoring continues through the present. Private drinking water wells were abandoned and the community water supply system was extended to affected residences and businesses prior to construction of the groundwater extraction system.

The data indicates the TCE concentration has generally been stable or decreasing at each of the monitoring wells as compared to the historical concentrations. The TCE concentration was less than the laboratory reporting limit in 11 of the 16 monitoring wells sampled in May 2006. The TCE concentration in the May 2006 samples increased at wells 18S, W28 and W30 as compared to the recent concentrations at these wells. Wells 18S, W28 and W30 are the only locations with a TCE concentration greater than the maximum contaminant level (MCL) (5 micrograms per liter) and the target TCE concentration set in the Record of Decision (ROD) (2.8 micrograms per liter). The data indicates the TCE plume is shrinking in areal extent and the wells with an elevated TCE concentration are clustered in an area along the southeast portion of the Site in the vicinity of pump-out well PW-7 which historically had the highest levels of TCE.

The remedy is functioning as intended and is protective of human health and the environment in the short-term. Long-term protectiveness will be verified based on the follow-up actions and recommendations. The remedy will be confirmed as fully protective once recommendations in Section IX are implemented.

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Five-Year Review Summary Form (page 1 of 2)

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: LeHillier/Mankato		
EPA ID *(from WasteLAN)*: MND980792469		
Region: 5	**State: MN**	**City/County: City of Mankato/Blue Earth County**
SITE STATUS		
NPL status: Final		
Remediation status: Complete		
Multiple OUs?* No	**Construction completion date: September 1989**	
Has site been put into reuse? No		
REVIEW STATUS		
Lead agency: State		
Author name: Nile Fellows		
Author title: Project Manager	**Author affiliation: MN Pollution Control Agency**	
Review period: April 2006 through September 2006**		
Date(s) of site inspection: 5 / 12 / 2006		
Type of review: Policy		
Review number: 3 (third)		
Triggering action: Previous Five-Year Review Report		
Triggering action date *(from WasteLAN)*: 9/27/2001		
Due date *(five years after triggering action date)*: 9/27/2006		

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form (page 2 of 2)

Issues:

1. The possible impact of the installation of a second Ranney Collector (municipal well 15) near the northern border of the Site on future groundwater flow and groundwater quality is unknown.

2. Institutional controls were not required in the Record of Decision, and there are no restrictions in place related to installation of private and municipal groundwater wells in the area of the Site where groundwater performance standards have not yet been met and where unlimited use and unrestricted exposure is not allowed.

3. A number of Site monitoring wells and city of Mankato monitoring wells were damaged and may require maintenance, and some Site monitoring wells could not be located. These wells could act as vertical conduits for migration of contaminants to groundwater. In addition, the pump-out wells and air stripper have not been operated since 1997.

Recommendations and Follow-up Actions:

1. The engineering analysis and pumping test conducted by contractors for the city of Mankato will be reviewed to confirm that the newly-constructed municipal well will not have an adverse impact on the plume configuration and groundwater quality.

2. The need for institutional controls will be evaluated, and, if necessary, controls will be implemented to restrict future development of water supplies and/or other activities within the Site area.

3. The Site and city of Mankato monitoring wells will be located. Damaged wells will either be repaired or properly abandoned. The pump-out wells and associated equipment will be properly dismantled and/or abandoned if they will no longer be used.

Protectiveness Statement(s):

The remedy is functioning as intended and is protective of human health and the environment in the short-term. Long-term protectiveness will be verified based on the follow-up actions and recommendations. The remedy will be confirmed to be fully protective once the recommendations in Section IX are implemented.

Other Comments: None

FIVE-YEAR REVIEW REPORT

LeHillier/Mankato Superfund Site
Mankato, Minnesota

I. INTRODUCTION

The purpose of the five-year review is to determine whether the remedy at the LeHillier/Mankato Superfund (LeHillier) site is protective of human health and the environment. The methods, findings and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues during the review, if any, and identify recommendations to address them.

The Minnesota Pollution Control Agency (MPCA) is preparing this five-year review report pursuant to CERCLA Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to ensure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

This requirement is interpreted further in the NCP; 40 CFR Section 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.*

The MPCA staff has completed a five-year review of the remedial action (RA) conducted at the LeHillier Superfund site in Mankato, Minnesota. This five-year review was conducted from April 2006 through September 2006 and focuses on the protectiveness of the remedy at the LeHillier site seventeen years from the time the remedial action commenced. This is the third five-year review completed by the MPCA. The first five-year review was completed on May 9, 1996, and the second review was completed on September 27, 2001.

II. SITE CHRONOLOGY

Date	Event
10/1981	MPCA began monitoring water quality in private wells.
1982-1983	USEPA conducted a preliminary Field Investigation Team (FIT Study) of the Site.
9/1983	Site listed on the National Priorities List (NPL).
10/1984	Site listed on the Minnesota Permanent List of Priorities (PLP).
1984	Community water supply system was installed to supply potable water to affected residences and businesses.
7/1985	The Remedial Investigation report was completed.
9/1985	USEPA executed a Record of Decision (ROD).
6/1988	Remedial Design was completed.
9/18/1989	Groundwater extraction system became operational.
5/9/1996	Completion of the first five-year review.
11/1997	Groundwater extraction system was shut down.
9/27/2001	Completion of the second five-year review.
11/21/2003	Site was deleted from the Minnesota PLP.
1997-present	Ongoing groundwater monitoring.

III. BACKGROUND

Physical Characteristics

The LeHillier Superfund site is located in south central Minnesota, approximately 80 miles southwest of the Twin Cities. The northern part of the Site is within the city of Mankato, which has a population of 33,844. This area is referred to as West Sibley Park. The southern half of the Site includes residential and industrial areas that are part of unincorporated LeHillier. A city park called Land of Memories is located along the northern portion of the Site. The Site is on properties just west of the Blue Earth River and just south of the Minnesota River. Site location and nearby features are shown in Attachment A, Figures 1 and 2.

Groundwater in the shallow aquifer beneath the Site moves multi-directionally in response to precipitation, surface topography, local aquifer use, and flow changes in the Blue Earth and Minnesota Rivers. Depending on flow in the rivers, the aquifer may be either recharged by the rivers or discharge into the rivers. In general, the effective flow direction in the shallow aquifer is northerly with the Blue Earth River exerting the greatest influence on groundwater characteristics.

Adjacent Land and Resource Use

The LeHillier site covers several square miles. The Chicago and Northwestern Railroad crosses the Site at approximately its north-south midpoint. The Site is bounded to the north by the Minnesota River and to the east by the Blue Earth River. LeHillier and West Sibley Park are situated in the floodplains of the Blue Earth and Minnesota Rivers. The

area was susceptible to seasonal flooding before the construction of a flood control system by the U.S. Army Corps of Engineers (COE) in the mid-1970s.

Land of Memories Park in West Sibley Park includes soccer fields, park pavilions, a camp ground, a boat landing, and is also the location of three municipal wells for the city of Mankato. Municipal well 13 (well 13) is a Ranney Collector located near the northeast corner of the park, and municipal well 14 (well 14) is a deep well located southwest of well 13. The city is currently constructing a second Ranney Collector (well 15) along the west side of the park (Attachment A, Figure 3). Well 15 will not be put into production until 2007. The deep well and well 13, the existing Ranney Collector, are primary production wells, with well 13 providing approximately 60 percent of the total volume of water for the municipal water supply system.

A Ranney Collector is a radial collector well that extracts water via multiple horizontal pumping arms instead of through a single vertically-placed well. The pumping arms radiate out from a central pumping shaft. Typically, Ranney Collector wells are shallower than vertical water supply wells and are often constructed next to rivers or other surface water bodies. In some cases, one or more of the lateral extraction wells extend beneath the adjacent surface water body. Municipal well 13 was constructed with eight lateral well arms that vary in length from 99 to 240 feet (Attachment A, Figure 4). Four of the eight lateral arms extend beneath the Blue Earth River. The lateral wells are approximately 45 feet below ground level (bgl).

There are a total of six municipal wells that provide the water supply for the city of Mankato. The three remaining wells are located in other parts of the city and two of these wells are stand-by wells which are used during periods of high demand or when other wells are shut down for maintenance. Approximately 33,844 year-round residents in the city are served by the municipal water system. The population served by the municipal water supply system increases by about 10,000 people when the University of Mankato is in session.

Another significant feature in the Site area is the COE flood control system. The system was completed in 1977 and consists of pumping stations, an earthen levee that begins at the southern tip of the Site and extends north along the Blue Earth River for approximately 2,000 feet, and a groundwater relief interceptor pipe. The pumping stations serve to accelerate groundwater movement toward the river during periods of high water table levels. This is done either by gravity flow or active pumping.

History of Contamination

The LeHillier area contained numerous natural and manmade depressions resulting from changes in the channels of the Minnesota and Blue Earth Rivers and from excavation of sand and gravel. Between 1925 and 1960, these depressions were filled with miscellaneous rubbish. No records of the dumping or disposal activities or types of waste materials placed in these depressions were kept.

In the fall of 1981, the MPCA received information which alleged the disposal of hazardous wastes at several dumps or fill areas in LeHillier. Subsequent investigations revealed halogenated volatile organic compound contamination of the shallow sand and gravel aquifer. Trichloroethylene (TCE) was the primary contaminant detected, although other contaminants detected in groundwater included 1,1,2-trichloroethene; 1,1-dichloroethane; 1,2-dichloroethene; 1,1,1-trichloroethane; 1,1,2,2-tetrachloroethane; tetrachloroethene; bromodichloroethane; methylene chloride; and 1,1-dichloroethene. The highest concentration of TCE in a residential well was 300 micrograms per liter (ug/l) found in a home near monitoring well 4S.

In addition to TCE identified in groundwater, petroleum hydrocarbons (ethyl benzene at 18,000 micrograms per kilogram (ug/kg), toluene at 2,400 ug/kg and xylenes at 81,000 ug/kg) were identified in subsurface soils in a small area at the end of Eleanor Road and adjacent to the southern part of the COE levee. This area was identified as a location of former waste disposal. Historically, the highest concentrations of TCE were detected in groundwater in four general locations – just to the south of the railroad tracks (wells 4S, 4D, 5S, and 5D); just to the north of the railroad tracks (well 8S); in the southeast area of the Site (wells 18S, W28 and W30 and pump-out well PW-7); and in the south-central area of the Site (well W24).

Efforts to locate a source(s) of the TCE contamination were unsuccessful. The TCE concentrations in the soil and septic system samples were low or below analytical method reporting limits. Since no specific sources of TCE were identified and no waste disposal records exist, no potential responsible parties (PRPs) were identified.

Initial Response

In late 1981, the Minnesota Department of Health issued a health advisory affecting approximately 200 residents in LeHillier. The advisory recommended that those affected seek an alternative water supply for cooking and drinking. Over 70 residential wells were sampled. During the fall of 1982 and the spring of 1983, U.S. Environmental Protection Agency (USEPA) conducted a preliminary investigation of the Site. Based on the study, the Site was given a Hazard Ranking System (HRS) score of 42 and was added to the National Priorities List (NPL).

A bottled water program was instituted by USEPA and was continued by the MPCA for residents of LeHillier whose well water contained TCE in concentrations greater than 25 ug/l. A Housing and Urban Development (HUD) grant for construction of an alternative groundwater supply well was sought and obtained by Blue Earth County on behalf of the LeHillier community. The water supply system was completed by the end of 1984. A sanitary sewer system was installed in 1987.

USEPA Remedial Investigation (RI) field activities took place between August 1984 and April 1985. The final RI report was completed on July 26, 1985. The RI activities documented the presence of an elongated 50-acre plume of TCE in the shallow unconfined aquifer (Attachment A, Figure 5). This contamination is believed to be the result of uncontrolled dumping at multiple locations in the LeHillier area. The plume

paralleled the Blue Earth River along the eastern half of the Site with the highest TCE concentrations in the southern portion of the Site. The leading edge of the plume was estimated to be 1/4-mile south of the city of Mankato municipal well 13.

Basis for Taking Action

The hazardous substances detected in Site soil were TCE, ethylbenzene, toluene, and xylenes, and the primary contaminant of concern in groundwater at the Site was TCE. The human health risk assessment completed for the Site showed an unacceptable excess lifetime cancer risk of 7×10^{-4} for adults who ingested groundwater from the private wells located in LeHillier, with the majority of the risk being due to the potential ingestion of TCE in groundwater. To achieve an acceptable excess risk of 1×10^{-6}, the groundwater performance standard of 2.8 ug/l for TCE was established in the ROD.

An assessment of potential risks due to contamination in soil was also conducted as part of the Site remedial investigation. Soil contamination was detected in two soil borings at depths between 24 and 34 feet below ground level. Because of the depth at which the contamination was found, the risk assessment concluded that exposure due to direct contact was unlikely; however, the route was evaluated nonetheless. Based on risk-related health values called "acceptable daily intakes" (ADIs), the risk assessment concluded that even in the event of direct ingestion of the soil, ADIs would not be exceeded and there would be no unacceptable health risks. In addition, a review of groundwater results showed that the presence of the ethylbenzene, toluene, and xylenes was limited to a few wells, and none of the compounds appeared in significant concentrations. In groundwater samples collected during the remedial investigation, the highest concentration of toluene observed was 6.3 ug/l, the highest concentration of ethylbenzene was 12 ug/l, and the highest concentration of xylenes was 71 ug/l. The risk calculations which included one or more of these three compounds showed that the total risk was not significant compared to the risk posed by the presence of TCE.

Based on the results of the risk assessment, the presence of TCE in groundwater was determined to be pose an unacceptable health risk, and a variety of cleanup actions to address the problem were evaluated.

IV. REMEDIAL ACTIONS

Remedy Selection

A Feasibility Study (FS) was completed on August 9, 1985. The recommended alternatives consisted of the following:

1. Groundwater extraction in the area of highest contamination, treatment by air stripping, and discharge to the Blue Earth River through the COE groundwater relief interceptor.

2. River recharge control by pumping existing groundwater relief wells which are part of the COE dike system.

3. Groundwater extraction at a blocking well located in West Sibley Park designed to intercept groundwater flowing north toward the Ranney Collector.

4. Abandonment of domestic wells within the area.

A ROD was completed by USEPA on September 27, 1985. The remedial goals and objectives as put forth in the ROD are as follows:

- Adequately protect the public against exposure to TCE through direct contact or ingestion of groundwater from a private and public water supply.
- Adequately protect the public against exposure to TCE released to surface water from the groundwater.
- Adequately protect and minimize damage to the environment from the migration of TCE in the groundwater.
- Reduce the levels of TCE to less than 2.8 ug/l within a five to ten year time period.

ARAR Review

As stated above, this five-year review is being conducted to determine whether the remedy at the LeHillier Superfund site remains protective of public health and the environment. Although Applicable and Relevant and Appropriate Requirements (ARARs) associated with the construction and long-term maintenance and monitoring of the remedial actions at the LeHillier Superfund site were not addressed in the ROD, the remedy did meet the objectives listed in the previous section. The site-specific cleanup level set for TCE is, in fact, more stringent than either the state or federal standards related to drinking water.

The lack of ARARs for this Site is due to the September 1985 completion date for the ROD, which was before the enactment of the Superfund Amendments and Reauthorization Act of 1986 (SARA). Prior to SARA, the Superfund statute did not require compliance with ARARs, but the NCP generally required that remedies meet federal environmental and public health laws and take into consideration federal and state environmental guidance documents. (See 40 CFR 300.68, proposed February 12, 1985, adopted November 20, 1985, and effective February 18, 1986.) SARA adopted similar requirements for remedies to comply with federal and more stringent state environmental laws that are applicable or relevant and appropriate. Although not specifically required by the ROD for the LeHillier site, several requirements that have been referred to in the course of implementing the remedy are:

1. Safe Drinking Water Act (SDWA), 40 CFR Parts 141-146. Establishes an MCL of 5 ug/l for TCE. This standard applies to municipal drinking water supplies.

2. Minnesota Rule 7060. Establishes uses and non-degradation for groundwater.

3. Minn. Rules Chapter 4725 (Water Well Code). Establishes requirements for well installation. Wells installed at the Site have been constructed in accordance with the Minnesota water well code.

4. Minnesota Statute 103H, Ground Water Protection Act. Establishes health risk limits (HRLs) for groundwater contaminants. The HRL for TCE was originally 30 ug/l; the revised HRL is 5 ug/l. The remedial action performance standards for groundwater are established in the ROD based on a health risk assessment for ingestion of drinking water at a 10^{-6} excess lifetime cancer risk concentration of 2.8 ug/l.

Remedy Implementation

Remedial design (RD) began August 3, 1987, as an MPCA lead. The final design varied from the FS in that the COE groundwater relief system was not used to control river recharge. Instead, seven extraction wells, with discharge through the COE interceptor, were designed to replace the selected dike system. The RD was completed in June 1988. Remedial action construction began in September 1988, and the operation of the groundwater treatment system began on September 18, 1989.

The system consisted of a primary plume extraction well (PW-7), which discharged to a packed tower air stripper, a blocking well (PW-1), and five pump-out wells (PW-2 through PW-6) (Attachment A, Figures 6 and 7). The five pump-out wells were designed to control the westward migration of clean river recharge water which would dilute water from the primary plume extraction well. These five pump-out wells discharged into the COE interceptor, which discharges into the Blue Earth River. Extraction well PW-7 pumped the most contaminated groundwater, which was treated by air stripping and discharged to the COE interceptor. The blocking well, PW-1, protected the Ranney Collector municipal water supply well (municipal well 13) and discharged directly to the Blue Earth River through an outfall. The remedial action also included the abandonment of 83 private wells. During construction, three cisterns were found and were subsequently cleaned and filled.

In November of 1997 the pump-out system was taken out of operation and a monitoring program initiated to evaluate the fate and transport of contamination under non-pumping conditions. The system was shut down based on the achievement of the cleanup criterion of 2.8 ug/l for TCE in five of the six pumpout wells since April 1991 or earlier and in the remaining pumpout well since June 1994. Groundwater samples have been collected from select monitoring wells since the system was shut down, and the most recent sampling was performed during May 2006. The groundwater samples are analyzed for volatile organic compounds listed under the applicable Minnesota Department of Health (MDH) method.

The MPCA delisted the LeHillier site from its PLP on November 21, 2003.

Institutional Controls

The 1985 ROD for the LeHillier site did not provide for institutional controls as part of the remedy. Institutional controls, or "ICs," are non-engineered instruments, such as administrative requirements, legal controls, and public information, that help to minimize the potential to exposure to contamination and that protect the integrity of the remedy. ICs are required to assure long-term protectiveness for any areas of a site that do not

allow for unlimited use or unrestricted exposure (UU/UE). Because contaminants remain at the LeHillier site above levels that would allow for unlimited use and unrestricted exposure and because there are still some areas where the performance standard for TCE in groundwater is not being met, the need for institutional controls will be evaluated. This initial evaluation, called an IC Action Plan, will provide a general assessment of the need for ICs, discuss the types of IC instruments that would be effective, provide recommendations about IC implementation and scope, present a list of actions to take to successfully implement the ICs, designate the party(ies) responsible for each action, and propose a schedule for completing each step.

If it is determined that ICs are necessary, an IC Implementation Plan will be developed. The IC Implementation Plan will include parcel maps depicting the areas that are subject to land and groundwater use restrictions. The maps will show the extent of groundwater contamination, the parcels affected by the contamination, and the areas for which ICs are planned and successfully implemented. These maps will be available to the public and will act as an additional control by serving as a source of information. In preparing the IC Implementation Plan, an evaluation of title commitment and prior-in-time encumbrances for all relevant properties will be done. The implementation plan will also establish a monitoring program that includes mechanisms to ensure regular inspection of ICs at the Site, procedures for communicating with affected parties and agencies, a process for certifying ICs on an annual basis, and plans for enforcing the controls and restrictions.

System Operations and Maintenance

Groundwater extraction was discontinued in 1997. The MPCA is performing periodic groundwater sampling and analysis at select monitoring wells. In May 2006, samples were collected from sixteen monitoring wells.

V. PROGRESS SINCE THE LAST REVIEW

The last five-year review, completed in 2001, contained several recommendations that are summarized as follows:

1. All monitoring wells on Site should be evaluated to determine if they are still necessary. All unnecessary wells should be sealed in accordance with Minnesota Department of Health Well Code 4725. The Site should also be evaluated to determine if additional monitoring points are needed in more strategic locations.

2. Once a monitoring well network has been established, a comprehensive groundwater monitoring plan should be developed to evaluate natural attenuation of the TCE plume. Groundwater sampling and analysis should continue on a semi annual basis.

3. Additional efforts to locate the TCE source should be considered. Since the area of increasing TCE concentrations is currently in the area of well 30, the source identification efforts may likely be limited to an area within one block of the well.

Technologies for locating the TCE source area may include the use of passive soil vapor collectors.

4. If natural attenuation is insufficient for purposes of containing or limiting the TCE plume, remedial alternatives should be evaluated. The remedial alternatives may include but are not limited to: (a) restarting the groundwater pump out system; (b) enhanced natural attenuation; and (c) contaminant mass source removal.

5. A copy of the five-year review of the LeHillier/Mankato Superfund site will be placed in the Information Repository established at the Minnesota Valley Regional Library, 100 East Main Street, Mankato.

The follow-up actions associated with the recommendations in the last five-year review are as follows:

1 and 2. The MPCA is currently sampling select monitoring wells on an approximate annual basis, although groundwater samples were not collected during 2003 and 2004. The TCE concentrations have generally been stable to decreasing as compared with historical concentrations, with the TCE concentration less than the laboratory reporting limit in 11 of the 16 monitoring wells sampled in May 2006. The TCE concentration in the May 2006 samples increased at wells 18S, W28 and W30 as compared to the recent concentrations at these wells. Wells 18S, W28 and W30 are the only locations with a TCE concentration greater than the MCL (5 ug/l) or the target TCE concentration (2.8 ug/l) set in the ROD. The TCE concentration at 18S had been below the cleanup levels since the early 1990s. The data indicates the TCE plume has reduced in size and is not moving. Additional monitoring wells are not necessary and abandonment of the existing monitoring wells should be evaluated.

3. The overall TCE concentrations are generally decreasing and the plume is shrinking in areal extent, although the highest TCE concentrations remain around W30, 18S and W28. Additional efforts to locate a source of the TCE are not warranted.

4. Because the TCE concentrations are low enough and of such limited extent, conventional remedial actions may be ineffective in further reducing the TCE concentrations. It appears that the original remedial system and the subsequent natural attenuation have adequately remediated the TCE plume. Monitoring was continued to ensure that the performance standard set in the ROD for TCE is achieved.

5. A copy of the previous five-year review completed in 2001 has been placed in the Information Repository.

VI. FIVE-YEAR REVIEW PROCESS

Administrative Components
The five-year review was initiated on April 21, 2006. The review components included:

- Community involvement;
- Document review;
- Data review;
- Site inspection;
- Local interviews: and
- Report development and review.

Community Involvement
Two representatives of the City of Mankato were notified by a telephone interview that a five-year review was being performed. The contacted individuals did not express a concern regarding the status and protectiveness of the remedy. One residential well was abandoned in May 2006 at the request of the homeowner.

On April 20, 2006 a notice was published in the *Mankato Free Press* newspaper announcing that a five-year review was being conducted for the LeHillier Superfund site (Attachment A, Figure 8). No comments were received.

Document Review
This five-year review consisted of a review of relevant documents including the ROD, assessment reports, MPCA staff correspondence and the previous five-year review reports. A list of the documents reviewed is presented in Attachment B.

Data Review
Groundwater extraction was discontinued in 1997. Pump-out well PW-6 was abandoned and the associated equipment was removed during May 2006 because the property owner would not renew the lease. The six remaining pump-out wells and associated equipment remain at the Site, although there appears to be damage to some of the electrical boxes and the status of the pumps and electrical service to the wells is unknown. The air stripper is also present at PW-7, although the status of the treatment media inside the air stripper is unknown and there are trees growing around the outside of the air stripper.

Groundwater samples have not been collected for analysis from the seven pump-out wells since 1997. The historical analytical data indicates the TCE concentration decreased at each of the wells from 1989 through 1997. At the time the pumping was discontinued in 1997, the TCE concentration had been below the performance standard of 2.8 ug/l for several years at these wells. Pump-out well PW-7, which was located in the vicinity of elevated TCE concentrations along the southern portion of the Site, exhibited a decrease in TCE concentration from 41 ug/l in 1989 to 0.9 ug/l in 1997. The analytical data is presented in Attachment C, Table 1.

Groundwater samples collected from select monitoring wells have been analyzed for VOCs since the mid-1980s. (See Attachment A, Figure 9, for map of monitoring wells.) The available TCE data from the mid-1980s through 2006 is presented in Attachment C, Table 2. Historically, the highest concentrations of TCE were detected in groundwater in four general locations – just to the south of the railroad tracks (wells 4S, 4D, 5S, and 5D); just to the north of the railroad tracks (well 8S); in the southeast area of the Site (wells 18S, W28 and W30 and pump-out well PW-7); and in the south-central area of the Site (well W24). TCE has not exceeded the performance standard of 2.8 ug/l in wells 4S, 5S, 5D, or 8S since 1994. Results from May 2006 were the first time that TCE was less than the standard in well 4D. The result from May 2006 from well 18S was the first exceedence of the TCE performance standard since 1989. However, wells W28 and W30, which are adjacent to well 18S, have been in exceedence of the standard during the majority of operation and monitoring. Well W24, located to the west of wells 18S, W28 and W30, was not sampled in May 2006. Except for one sample collected in 1989, well W24 has been in exceedence of the performance standard for TCE. However, the sample collected on April 22, 2005 met the MCL. Attachment D includes graphs of TCE concentrations in monitoring wells 18S, W24, W28, and W30.

The data indicates the TCE concentration has generally been stable or decreasing at each of the monitoring wells as compared to the historical concentrations. The TCE concentration was less than the laboratory reporting limit in 11 of the 16 monitoring wells sampled in May 2006. The TCE concentration in the May 2006 samples increased at wells 18S, W28 and W30 as compared to the recent concentrations at these wells. Wells 18S, W28 and W30 were the only locations during May 2006 with a TCE concentration greater than the MCL or the target TCE concentration set in the ROD. Concentrations of TCE have dropped from a high of 100 ug/l (1989) in 4D to 0.7 ug/l in 2006; from 26 ug/l (1987) in 8S to non-detect in 2006; from 560 ug/l (1987) in W30 to 10.4 ug/l in 2006; and from 55 ug/l (1986) in 18S to 18.7 ug/l in 2006. The data indicates the TCE plume is shrinking in areal extent (Attachment A, Figure 7) and the wells with an elevated TCE concentration are primarily clustered in an area along the southeast portion of the Site in the vicinity of pump-out well PW-7.

Site Inspection

A site inspection was conducted on May 12, 2006 as part of the five-year review process. Most, but not all, of the monitoring wells and pump-out wells referenced in this document were located. Some of the monitoring wells are damaged. A number of monitoring wells were abandoned over the years. The abandoned monitoring wells appear to include 1RX, 1S, 2RX, 3S, 9S, 10S, 19S, 20S, 21S, W22, W24, W25, W26 and W27.

During the site inspection, the city of Mankato was in the process of constructing a second Ranney Collector (municipal well 15) for the municipal water supply system. The second Ranney Collector was located to the southwest of the existing Ranney Collector (Attachment A, Figure 3).

Interviews
An interview was not conducted with a representative of the responsible party since a responsible party has not been identified. No other community members or residents were interviewed. In general, the awareness of the Site in the community seems to be low.

VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?
There were four remedial goals and objectives specified in the ROD, which are listed in the Remedy Selection portion of Section IV of this five-year review.

The first three criteria have been met because: (1) private drinking water wells were abandoned and water from a public water supply system was provided to the affected residences and businesses; (2) the TCE concentrations at the monitoring wells and pump-out wells are significantly lower than concentrations detected in the early 1980s which should result in less discharge to the surface water; and (3) the TCE concentration was less than the laboratory reporting level in 11 of the 16 wells sampled in May 2006 and the plume appears to have decreased in areal extent.

The fourth criterion was to reduce the levels of TCE to less than 2.8 ug/l within a five to 10 year time period. The May 2006 sampling data indicates only three monitoring wells, 18S, W28 and W30, have a TCE concentration greater than 2.8 ug/l. These wells are clustered around pump-out well PW-7, along the southern portion of the Site. Although the concentrations remain above 2.8 ug/l at these wells, the remedy has reduced the TCE concentration below 2.8 ug/l in the majority of Site monitoring wells. Because of the low concentrations and the limited extent of the plume, it is doubtful whether further remedial actions will result in a further reduction in the TCE concentration at these wells. All residents are connected to municipal water. However, the need to implement ICs to control groundwater use at those wells that still contain TCE above 2.8 ug/l will be reviewed as a follow-up action to this five-year review.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?
The RAOs established at the time of the remedy selection are still valid. The MCL remains at 5 ug/l and the HRL has been changed from 30 ug/l to 5 ug/l for TCE. The ROD established a performance standard of 2.8 ug/l for TCE. The performance standard established in the ROD remains more protective than the MCL and revised HRL.

Question C: Has any other information come to light that could question the protectiveness of the remedy?
There have been no changes to the groundwater remedy at the LeHillier Superfund site since completion of the last five-year review that have impacted the effectiveness of the remedy. The city of Mankato is constructing a second Ranney Collector (municipal well

15) in Land of Memories Park to the southwest of the existing Ranney Collector (municipal well 13). The locations of the former and new municipal well are approximately one mile north of the on-site monitoring wells that contained TCE in May 2006 at levels above the performance standard in the ROD and are approximately 2000 feet north of the on-site monitoring well that contained TCE in April 2005 at a level above the performance standard in the ROD. The contractor for the city of Mankato conducted a pumping test as part of the construction of the new municipal well. VOCs, including TCE, were not detected in a water sample collected on May 17, 2006 from the new municipal well. In addition, TCE was not detected in groundwater samples collected in 2005 and 2006 from the monitoring wells closest to the two municipal well locations in the Land of Memories Park (8S, 12S, 14S, 15S and 16S). Based on the reported analytical results of the pumping test and on the distance between the Site plume and the municipal wells, it is not likely that the municipal wells will adversely affect the remedy. However, the pumping test hydrologic data from municipal well 15 will be evaluated to determine if the municipal wells could adversely affect the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. ISSUES

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
The possible impact of the installation of a second Ranney Collector (municipal well 15) on the groundwater flow and groundwater quality in Land of Memories Park is unknown.	N	Y
Institutional controls are not in place to restrict installation of private and municipal groundwater wells in the area of the Site where groundwater performance standards have not yet been met.	N	Y
A number of Site monitoring wells and city of Mankato monitoring wells were damaged and may require maintenance, and some Site monitoring wells could not be located. These wells could act as vertical conduits for migration of contaminants to groundwater. In addition, the pump-out wells and air stripper have not been in operation since 1997.	N	Y

IX. RECOMMENDATIONS

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N) Current	Future
The possible impacts of the new Ranney Collector, municipal well 15, on the groundwater flow and quality in the vicinity of the Site is unknown.	The engineering analysis and pumping test conducted by the city of Mankato will be reviewed to confirm that the new municipal well will not have an adverse impact on the plume and groundwater quality.	MPCA	USEPA	June 2007	N	Y
Institutional controls are not in place to restrict installation of private and municipal groundwater wells in the area of the site where groundwater performance standards have not yet been met.	The need for institutional controls will be evaluated. If determined to be necessary, institutional controls will be implemented.	MPCA/ USEPA	USEPA	Complete evaluation of ICs (IC Action Plan) by 3/07; implement according to schedule in approved plan	N	Y
A number of site and city monitoring wells were damaged and may require maintenance, and some site wells could not be located. These wells could act as vertical conduits for migration of contaminants to groundwater. In addition, the pump-out wells and air stripper have not been in operation since 1997.	Site and city of Mankato monitoring wells will be located. Damaged wells will either be repaired or properly abandoned. The pump-out wells and air stripper will be properly abandoned or dismantled if they will not be used in the future.	MPCA	USEPA	Complete inventory of wells by 6/07; obtain cost estimate for repairs/ abandonment by 9/07; abandon or repair by 6/08	N	Y

X. PROTECTIVENESS STATEMENT

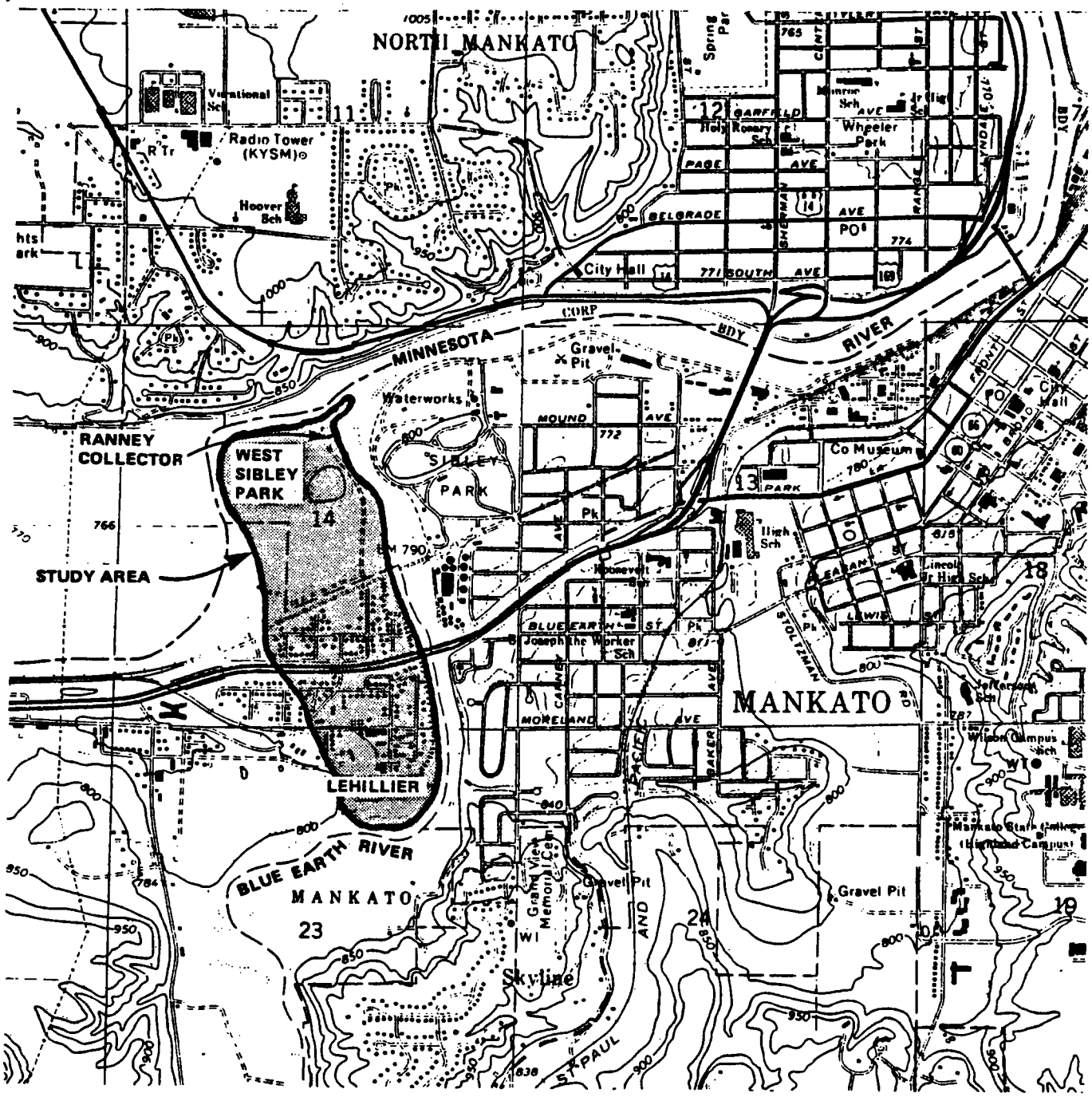
The remedy is functioning as intended and is protective of human health and the environment in the short-term. Long-term protectiveness needs to be verified based on the follow-up actions and recommendations. The remedy would be confirmed to be fully protective if recommendations cited in Section IX are implemented.

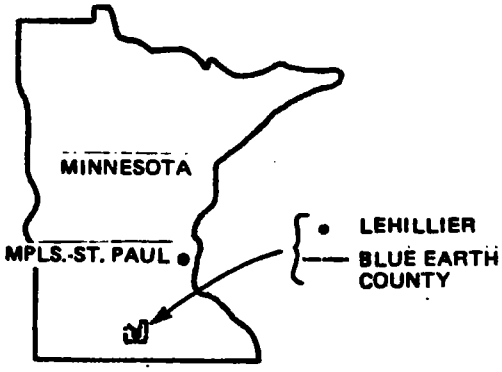
XI. NEXT REVIEW

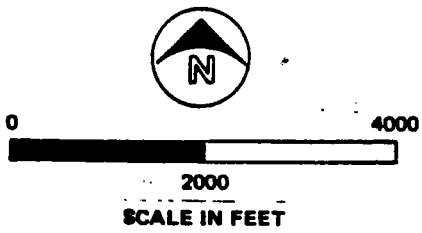
Hazardous substances, pollutants, or contaminants will remain at the LeHillier Superfund site that will not allow for unlimited use or unrestricted exposure. USEPA, or the MPCA if delegated to do so by USEPA, will conduct another five-year review by September 27, 2011.

ATTACHMENTS

ATTACHMENT A







SOURCE: USGS Mankato West Quadrangle Map, 1974.

Attachment A
Figure 1: Site Location

LeHillier/Mankato Five-Year Review
September 2006

Site Features

Superfund
U.S. Environmental Protection Agency

LeHillier/Mankato
Blue Earth County, MN

MND980792469

Legend

- Lehillier/Mankato Site
- Chicago and Northwestern Railroad
- Land of Memories Park
- COE Levee
- COE Interceptor Pipe
- COE Pumping Station
- Municipal Wells

0 400 800 Feet

N

GEOS Groundwater Evaluation and Optimization System

Attachment A
Figure 2: Site Features

LeHillier/Mankato Five-Year Review
September 2006

Municipal Well Locations

Superfund
U.S. Environmental Protection Agency

LeHillier/Mankato
Blue Earth County, MN

MND980792469

Legend

- Lehillier/Mankato Site
- Chicago and Northwestern Railroad
- Land of Memories Park
- Municipal Wells

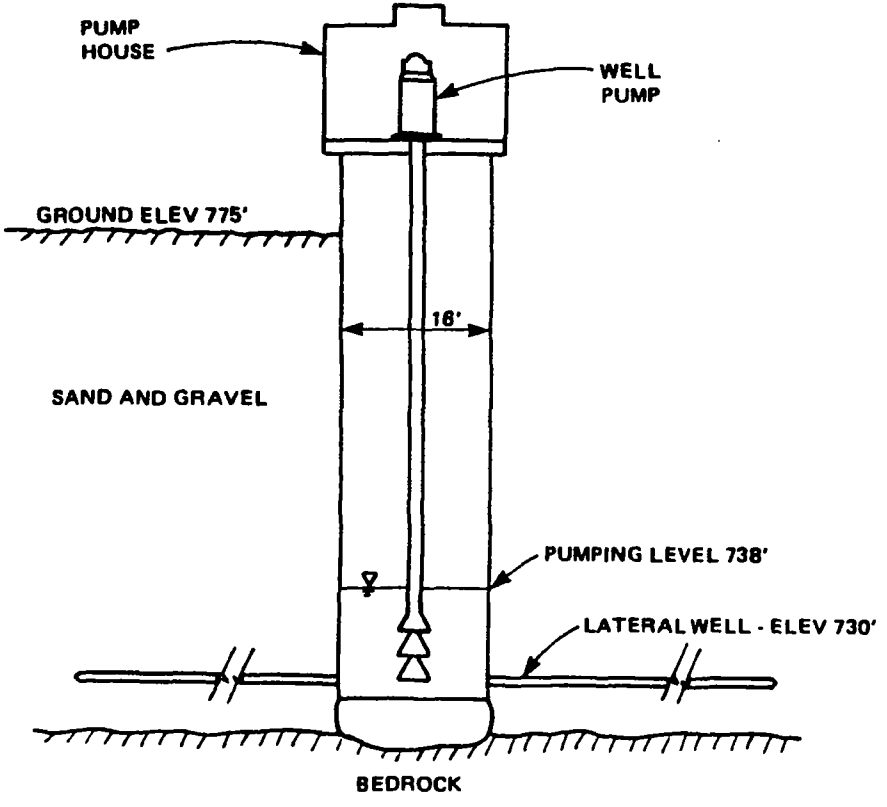
0 400 800 Feet

N

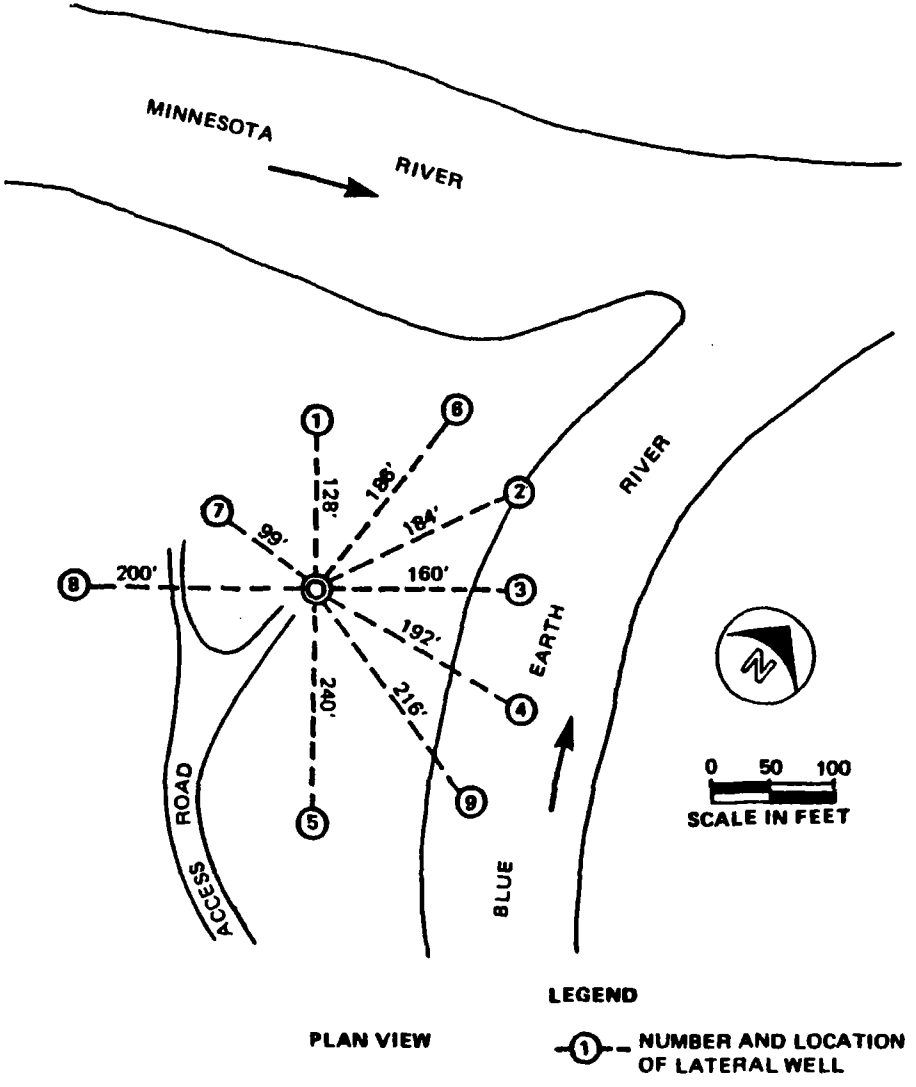
GEOS
Groundwater Evaluation and Optimization System

Attachment A
Figure 3: Municipal Wells

LeHillier/Mankato Five-Year Review
September 2006



CROSS SECTION VIEW

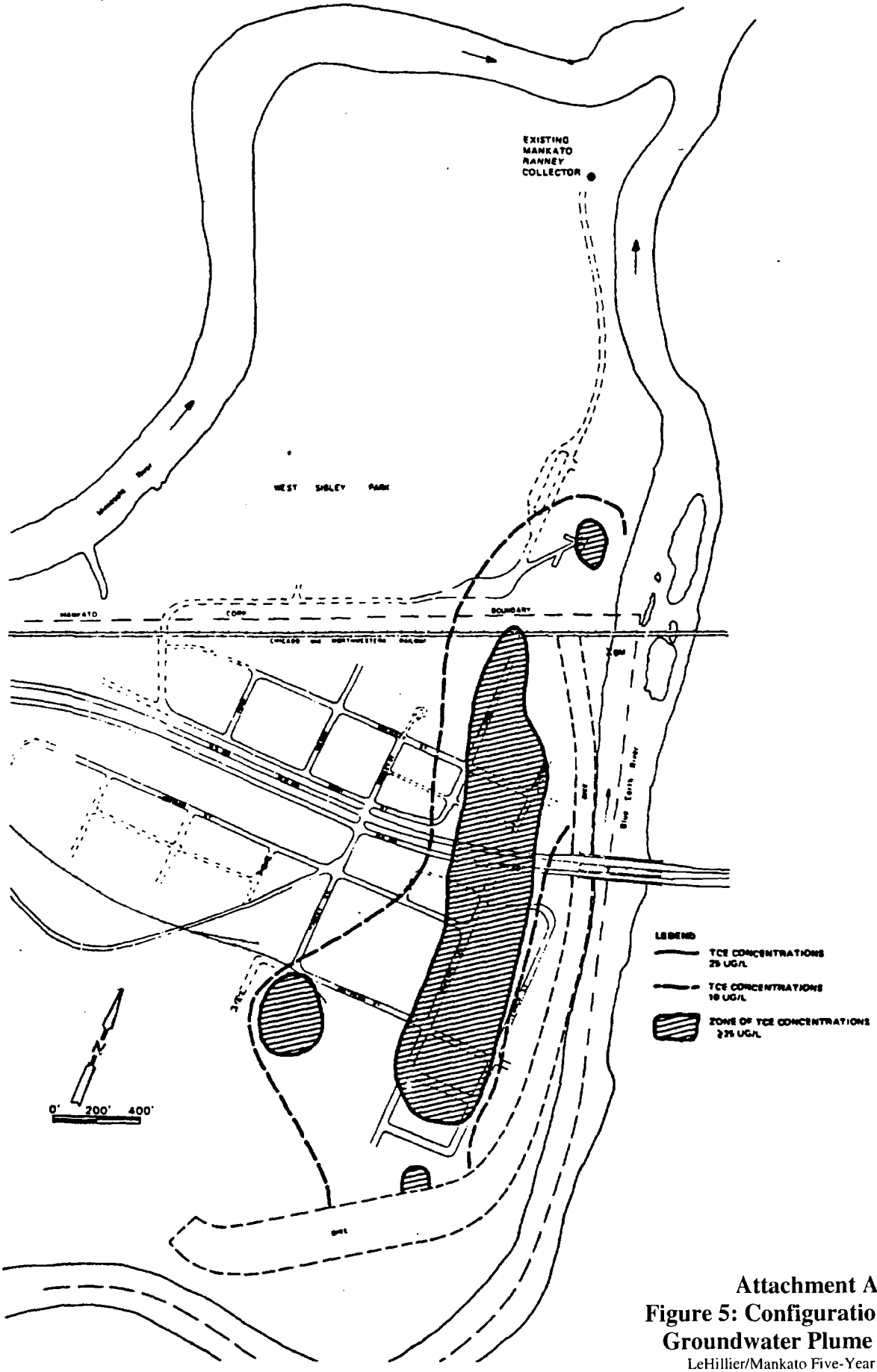


PLAN VIEW

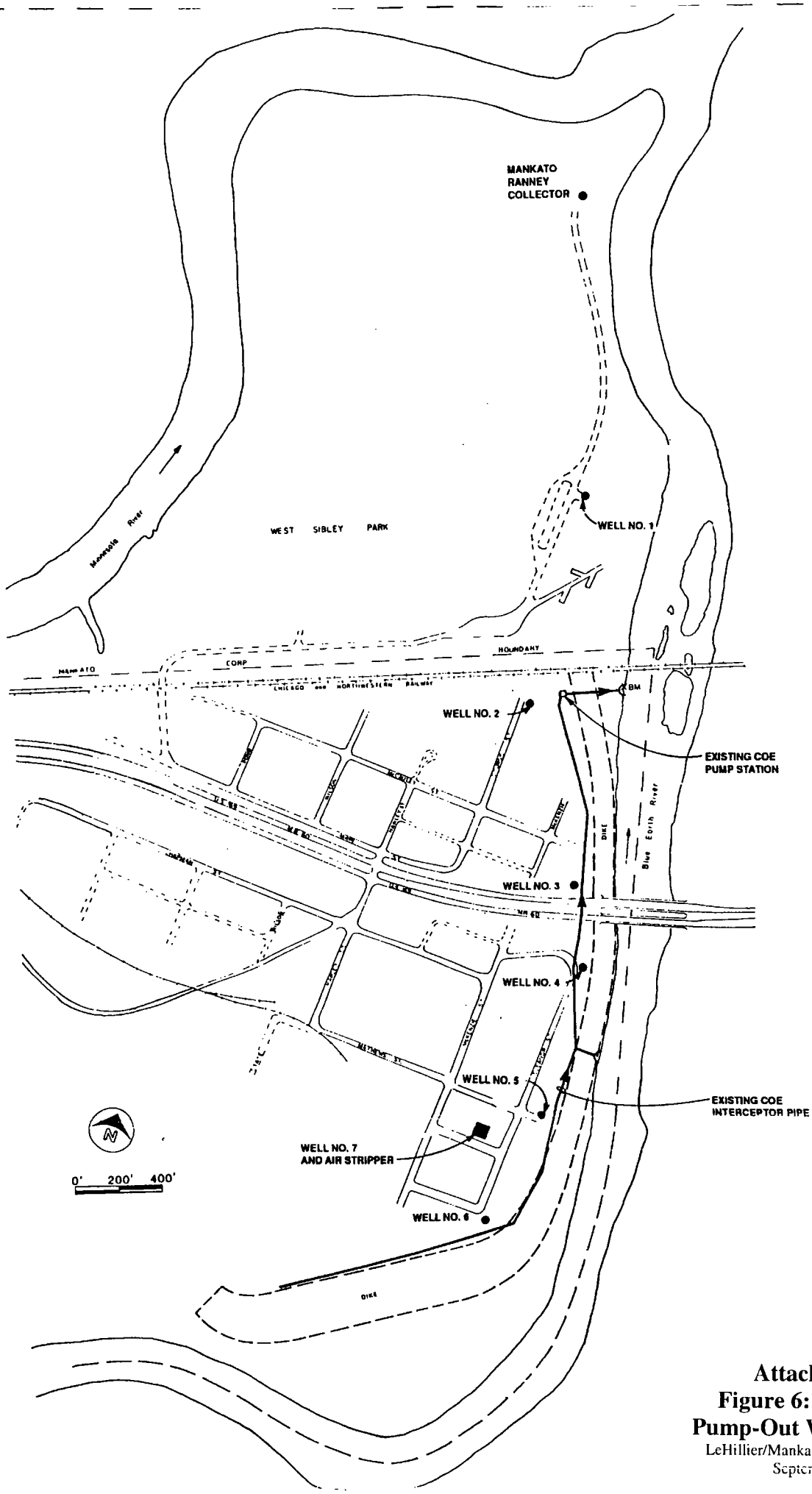
FIGURE 2-18
LOCATION AND CONSTRUCTION OF THE CITY OF MANKATO'S RANNEY COLLECTOR
LEHILLIER SITE

Attachment A
Figure 4: Location and Construction of Municipal Well 13
LeHillier/Mankato Five-Year Review
September 2006

Attachment 3



Attachment A
Figure 5: Configuration of TCE Groundwater Plume in 1984
LeHillier/Mankato Five-Year Review
September 2006



Attachment A
Figure 6: Diagram of Pump-Out Well Locations
LeHillier/Mankato Five-Year Review
September 2006

Locations of Groundwater Pump-Out Wells and Air Stripper

Superfund
U.S. Environmental Protection Agency

LeHillier/Mankato
Blue Earth County, MN

MND980792469

Legend

- Lehillier/Mankato Site
- Chicago and Northwestern Railroad
- Pump-Out Wells
- Air Stripper

0 400 800 Feet

N

GEOS
Groundwater Evaluation and Optimization System

Attachment A
Figure 7: Map of Pump-Out Well Locations
LeHillier/Mankato Five-Year Review
September 2006

Lehillier
Superfund Site
Lehillier/Mankato, Minnesota

The U.S. Environmental Protection Agency and the Minnesota Pollution Control Agency are reviewing the effectiveness of the cleanup at the Lehillier Superfund site in Lehillier, Minnesota. Superfund law requires five-year reviews of sites where the cleanup is either done or in progress, but hazardous waste remains on site. These five-year reviews are done to ensure that the cleanup remains effective and protects human health and the environment. This is the third five-year review for this site.

The first five-year review was completed in 1996 and the second review was completed in 2001. Both reviews addressed overall site conditions. The reports concluded that the cleanup actions at the site were protective of human health and the environment.

Five-year reviews look at:
* site information
* how the cleanup was done
* how well the cleanup is working
* any future actions needed

Site records are at the MPCA, 520 Lafayette Rd., St. Paul, Minnesota. The MPCA is open Monday through Friday from 8:00 a.m. to 4:00 p.m. To review the records, please contact Chris Malec, Records Manager at (651) 297-5177.

Comments and questions will be accepted until July 1, 2006. Please direct your comments or concerns regarding the cleanup to:

Nile Fellows
Project Manager
MPCA
520 Lafayette Road North
St. Paul, Minnesota 55155
(651) 296-7299
Nile.fellows@pca.state.mn.us

MANKATO 4/20

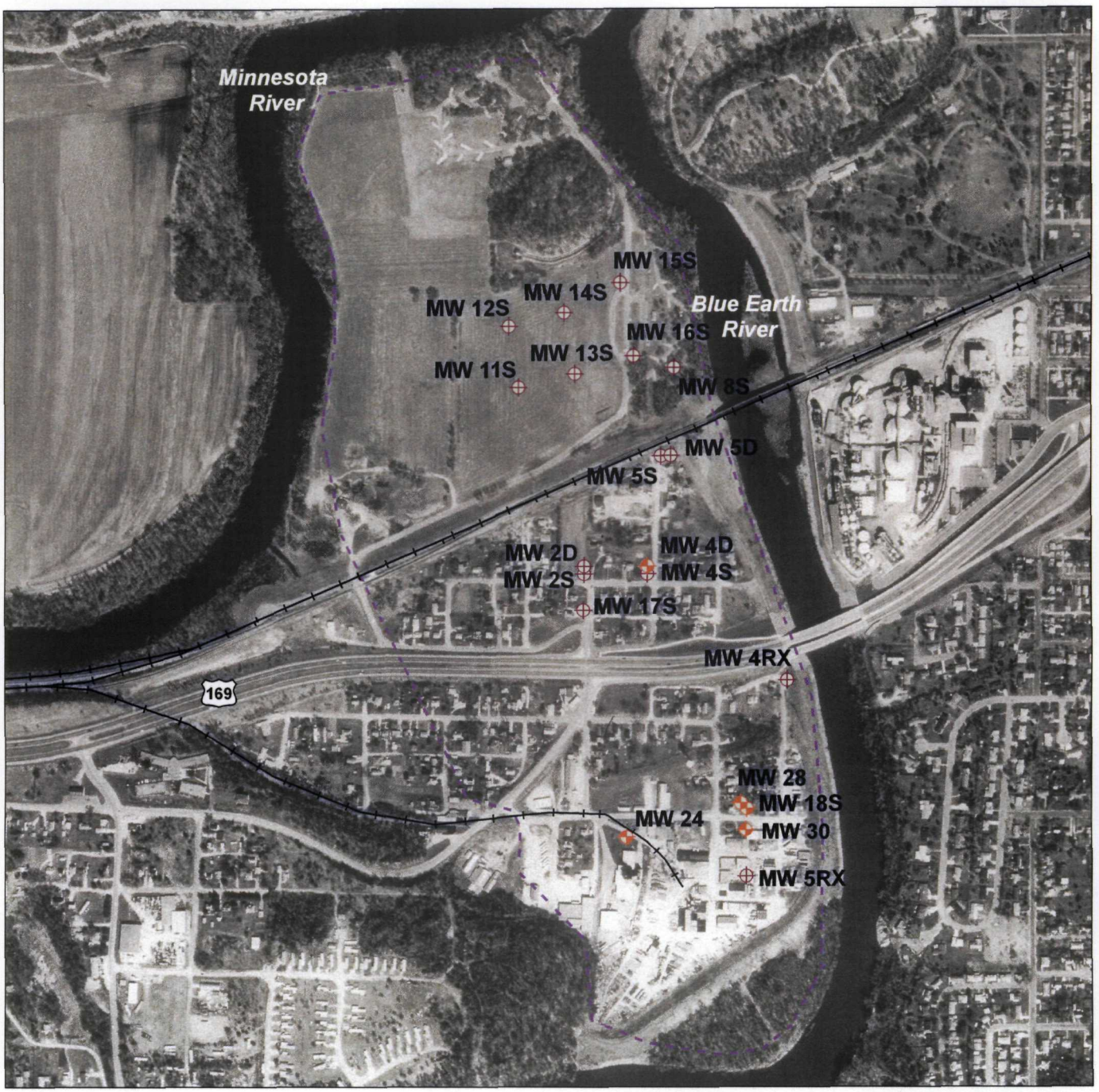
Attachment A
Figure 8: Public Notice for Five-Year Review
LeHillier/Mankato Five-Year Review
September 2006

Locations of Site Monitoring Wells

Superfund
U.S. Environmental Protection Agency

LeHillier/Mankato
Blue Earth County, MN

MND980792469



Legend

- Lehillier/Mankato Site
- Chicago and Northwestern Railroad
- Monitoring Wells
- Monitoring Wells with TCE hits

0 400 800 Feet

N

GEOS
Groundwater Evaluation and Optimization System

Attachment A
Figure 9: Map of Monitoring Well Locations
LeHillier/Mankato Five-Year Review
September 2006

ATTACHMENT B

DOCUMENTS REVIEWED

Preliminary Hydrogeologic and Extent of Contamination Investigation, LeHillier/Mankato Study Area, Ecology and Environment, Inc., November 1983

Final Remedial Investigation Report, LeHillier Site, CH2M Hill, Inc., July 26, 1985

Record of Decision, Remedial Alternative Selection, LeHillier/Mankato, Mankato, Minnesota, U.S. EPA, September 1985

Remedial Action Interim Report, Groundwater Extraction and Treatment System, LeHillier, Minnesota, CH2M Hill, Inc., October 1989

Operations Manual for the Groundwater Extraction and Treatment System, LeHillier, Minnesota, CH2M Hill, Inc., October 1989

Site Review and Update, LeHillier Mankato Site, Mankato, Blue Earth County, Minnesota, U.S. Department of Health and Human Services, August 26, 1992

Interim Close-Out Report for the LeHillier/Mankato Superfund Site, U.S. EPA, September 7, 1992

Site Report for LeHillier Mankato, Ecology and Environment, Inc., September 30, 1993

Public Health Consultation for the LeHillier/Mankato Site, South Bend Township, Minnesota, Minnesota Department of Health, September 12, 1994

Five Year Review, LeHillier Superfund Site, LeHillier, Minnesota, MPCA, May 9, 1996

Five Year Review, LeHillier Superfund Site, LeHillier, Minnesota, MPCA, September 27, 2001

Approval of the November 2003 Update of the Minnesota Environmental Response and Liability Act Permanent List of Priorities, MPCA, November 21, 2003

Drinking Water Laboratory Report, Underwriters Laboratory, Inc., June 2006

ATTACHMENT C

Table 1
Pump-out Well TCE Data
Lehillier Superfund Site
Mankato, Minnesota

	PW-1	PW-2	PW-3	PW-4	PW-5	PW-6	PW-7
9/17/1989	-	-	2.4	0.7	1.8	38	40
9/18/1989	-	19	-	-	-	-	-
9/19/1998	-	-	-	-	3.2	34	37
9/20/1989	-	3.1	19	2.2	-	-	-
9/21/1989	-	-	-	-	-	-	-
9/22/1989	3.6	19	2.9	2.7	4	22	41
9/28/1989	7	-	-	-	-	-	-
10/3/1989	3.6	-	-	-	-	-	-
11/16/1989	3.2	ND	3.6	0.8	0.3	9.6	17
12/12/1989	ND	-	-	-	-	-	-
1/11/1990	2.5	11	6.5	0.7	0.2	5	ND
3/13/1990	-	-	-	-	-	-	-
4/6/1990	1.4	0.6	2.1	-	ND	3	4.6
6/14/1990	ND	-	-	-	-	-	-
6/15/1990	0.3	6	-	ND	ND	2.1	3
10/26/1990	1.1	ND	1	0.2	0.1	3.2	5.9
4/26/1991	0.2	1.6	0.1	ND	ND	1.3	1.2
5/15/1991	-	-	-	-	-	-	-
10/17/1991	1.3	1.3	1.2	1.2	-	-	-
10/21/1991	-	-	-	-	-	-	-
5/14/1992	2.1	-	2	-	0.2	2	3.6
10/31/1992	1.3	1.3	1.2	1.2	1.3	ND	4.1
11/6/1992	-	1.4	0.3	ND	ND	0.7	1.7
5/11/1993	-	-	-	ND	ND	1	1.4
10/19/1993	0.8	ND	1	0.4	ND	-	2.9
6/3/1994	-	-	0.8	0.2	ND	0.9	2.2
5/11/1995	-	0.7	0.1	ND	ND	0.5	0.9
5/29/1996	0.4	0.6	ND	ND	-	-	-
10/9/1996	0.3	0.5	-	0.2	ND	-	1.5
6/2/1997	-	-	-	-	-	-	0.8
6/3/1997	-	-	-	ND	ND	-	-
9/29/1997	0.4	0.9	-	-	-	-	0.9

The concentrations are presented as micrograms per liter (ug/l)
ND - Not detected in a concentration at or above the laboratory reporting level
" - " Sample was not collected for analysis
PW-1 Pump-out Well No. 1
TCE - Trichloroethylene

Attachment C
Table 1: TCE Data for Pump-Out Wells
LeHillier/Mankato Five-Year Review
September 2006

Table 2
Monitoring Well TCE Data
Lehillier Superfund Site
Mankato, Minnesota

Sample Date	Monitoring Wells																					
	2S	2D	4S	4D	4RX	5D	5RX	5S	8S	11S	12S	13S	14S	15S	16S	17S	18S	W24	W28	W30	W42	W43
5/15/1986	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6/16/1986	-	-	8.8	-	-	-	-	-	-	-	-	-	-	-	19	-	-	-	-	-	-	ND
6/17/1986	-	-	-	-	-	-	-	24	-	-	-	-	-	2.5	-	-	55	-	-	-	-	-
8/12/1987	ND	ND	3.7	74	ND	4.7	ND	12	26	ND	ND	0.7	0.2	7.9	6	ND	28	20	-	560	-	ND
4/16/1987	-	-	1.7	50	-	7.1	0.2	16	-	-	-	-	-	-	-	-	23	-	-	-	-	-
9/19/1989	-	-	11	100	-	24	-	11	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-
9/21/1989	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	11	-	-	-	2.4	-
3/13/1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	-
5/15/1991	-	-	1.8	42	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-	-	ND	0.1
10/21/1991	-	-	3.7	38	-	-	-	-	-	-	-	-	3.9	-	-	-	-	-	-	-	ND	ND
6/3/1994	ND	ND	0.8	19	0.1	0.4	1.1	ND	-	-	-	0.4	-	2.2	-	-	1.5	17	39	-	ND	-
5/11/1995	-	ND	0.3	16	-	-	-	-	-	ND	-	-	0.5	-	-	-	-	9.8	15	-	ND	ND
5/29/1996	-	-	0.2	28	-	-	-	-	-	-	-	-	ND	1.8	-	-	-	14	19	-	-	-
10/9/1996	-	-	0.1	32	-	-	-	-	-	-	-	-	-	0.8	-	-	0.2	15	23	-	-	-
6/2/1997	-	-	-	37	-	1.0	-	-	-	ND	-	ND	ND	0.4	-	-	-	-	34	-	-	-
6/3/1997	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-
9/29/1997	-	-	ND	25	-	-	-	-	-	-	-	0.3	ND	ND	-	-	-	12	28	-	-	-
9/30/1997	-	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6/22/1998	-	-	0.2	27	-	-	0.7	-	-	-	-	-	-	-	-	-	-	8.3	14	1.4	-	-
12/1/1998	ND	ND	0.3	30	ND	0.8	-	0.2	ND	-	ND	-	0.1	0.5	0.1	-	-	-	18	-	-	ND
12/2/1998	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	ND	0.7	6.2	-	3.5	-	-
9/7/1999	-	-	-	27.6	-	-	-	-	-	-	-	-	-	-	-	-	-	7.3	18.4	5.8	-	-
6/12/2000	-	-	0.7	29.6	-	-	0.7	-	-	-	-	-	-	-	-	-	-	6.1	3.8	9.1	-	-
11/13/2000	-	-	ND	24.4	-	-	0.8	-	-	-	-	-	-	-	-	-	-	7.6	4.1	6.7	-	-
4/4/2001	-	-	ND	23	ND	1.3	ND	ND	-	-	ND	-	-	0.8	-	-	-	6.2	4.2	7.5	ND	ND
6/7/2002	-	-	ND	19.4	-	-	ND	-	-	-	-	-	-	-	-	-	0.9	6.9	8.8	6.7	-	-
9/19/2002	-	-	ND	20	-	-	ND	-	-	-	-	-	-	-	-	-	0.8	4.8	8.7	6.7	-	-
4/22/2005	-	-	ND	16.8	ND	1.0	ND	ND	ND	-	ND	-	ND	ND	ND	-	0.9	4.8	5.7	7.4	ND	ND
5/23/2006	-	-	ND	0.7	ND	1.1	ND	ND	ND	-	ND	-	ND	ND	ND	-	18.7	-	11.4	10.4	ND	ND

Concentrations are expressed as micrograms per liter (ug/l)
ND - Not detected in a concentration at or above the laboratory reporting level
" - " Sample was not collected for analysis
TCE - Trichloroethylene

Attachment C
Table 2: TCE Data for Monitoring Wells
LeHillier/Mankato Five-Year Review
September 2006

ATTACHMENT D

TCE in PW-1
LeHillier/Mankato Site

TCE in PW-2
LeHillier/Mankato Site

TCE in PW-3
LeHillier/Mankato Site

TCE in PW-4
LeHillier/Mankato Site

TCE in PW-5
LeHillier/Mankato Site

TCE in PW-6
LeHillier/Mankato Site

TCE in PW-7
LeHillier/Mankato Site

TCE Concentration in Monitoring Well 18S
Lehillier/Mankato Landfill Site

TCE Concentration in Monitoring Well W24
Lehillier/Mankato Landfill Site

TCE Concentration in Monitoring Well W28
Lehillier/Mankato Landfill Site

TCE Concentration in Monitoring Well W30 (1987 to 2006)
Lehillier/Mankato Landfill Site
[lognormal scale]